CLAIMS

What is claimed is:

1. An electrospun fiber, wherein said fiber is produced from a conducting solution wherein said conducting solution comprises at least one mesoporous precursor material.

2. The fiber of claim 1, wherein the mesoporous precursor material comprises gels prepared with surfactants.

3. The fiber of claim 2, wherein said surfactants are selected from the group consisting of pluronic P-123, pluronic F-127, pluronic F-77, pluronic P-104, pluronic F-38, pluronic L-121, Vitamin E TPGS, Tergitols, Triton-X, polyethylene glycol, alkyl ammonium halides, alkyl amines and mixtures thereof.

4. The fiber of claim 1, wherein said mesoporous precursor material comprises a metal oxide selected from the group consisting of silicon dioxide, aluminum oxide, titanium dioxide, niobium oxide, tungsten oxide, tantalum oxide, vanadium pentoxide, indium tin oxide, calcium aluminate and mixtures thereof.

5. The fiber of claim 1, wherein said fiber has a diameter ranging from about 10 nanometers up to about 1,000 nanometers

6. A network of fibers wherein, said network comprises fibers comprising mesoporous precursor material, and further wherein, said fibers are produced by electrospinning.

7. The fibers of claim 6, wherein the mesoporous precursor material comprises gels prepared with surfactants.

8. The fibers of claim 7, wherein said surfactants are selected from the group consisting of pluronic P-123, pluronic F-127, pluronic F-77, pluronic P-104, pluronic F-38, pluronic L-121,

Vitamin E TPGS, Tergitols, Triton-X, polyethylene glycol, alkyl ammonium halides, alkyl amines and mixtures thereof.

11. The fibers of claim 6, wherein said mesoporous precursor material is a metal oxide selected from the group consisting of silicon dioxide, aluminum oxide, titanium dioxide, niobium oxide, tungsten oxide, tantalum oxide, vanadium pentoxide, indium tin oxide, calcium aluminate and mixtures thereof.

12. A method for electrospinning a fiber from a conducting solution comprising,

-establishing an electric field between a conducting solution introduction device and a target,

-feeding said conducting fluid from a reservoir to the conducting solution introduction device,

-forming a jet of said conducting solution,

-applying an electric current to said jet to form fibers, and,

-collecting said fiber on a target;

wherein said conducting solution comprises at least one mesoporous precursor material.

13. The method of claim 12, wherein said conducting fluid introduction device is selected from the group consisting of a metal needle with a flat tip and a glass pipette.

14. The method of claim 12, wherein said electric field ranges from about 5 kilovolts to about 100 kilovolts.

15. The method of claim 14, wherein said electric field is about 20 kilovolts.

16. The method of claim 12, wherein said conducting solution is fed to said conducting solution introduction device at a controlled rate.

17. The method of claim 16, wherein said rate ranges from about 0.1 to about 1000 microliters/minute.

18. The method of claim 16, wherein said rate is controlled by maintaining said conducting fluid at a constant pressure or constant flow rate.

19. The method of claim 12, wherein said target is a metal screen, mechanical reel, aerodynamic current or an aqueous liquid.

20. The method of claim 12, wherein the mesoporous precursor material comprises gels prepared with surfactants.

21. The method of claim 20, wherein said surfactants are selected from the group consisting of pluronic P-123, pluronic F-127, pluronic F-77, pluronic P-104, pluronic F-38, pluronic L-121, Vitamin E TPGS, Tergitols, Triton-X, polyethylene glycol, alkyl ammonium halides, alkyl amines and mixtures thereof.

22. The method of claim 12, wherein said mesoporous precursor material comprises a metal oxide selected from the group consisting of silicon dioxide, aluminum oxide, titanium dioxide, niobium oxide, tungsten oxide, tantalum oxide, vanadium pentoxide, indium tin oxide, calcium aluminate and mixtures thereof.

23. The method of claim 12, wherein said fiber has a diameter ranging from about 10 nanometers up to about 1,000 nanometers

24. A method for electrospinning a fiber from a conducting solution in the presence of an electric field established between a conducting solution introduction device and a target comprising: a) forming an electrospinning jet stream of said conducting solution, wherein said conducting solution comprises at least one mesoporous material; and b) electrically controlling the flow characteristics of said jet stream.

25. The method of claim 24, wherein said flow characteristics of said jet stream are electrically controlled by at least one electrode.

26. An electrospinning apparatus comprising one or more conducting solution introduction devices for providing a quantity of conducting solution, said conducting solution introduction devices being electrically charged thereby establishing an electric field between said conducting solution introduction devices and a target; and means for controlling the flow characteristics of conducting solution from said one or more conducting solution introduction devices.

27. The apparatus of claim 26, wherein said means for independently controlling the flow characteristics comprises at least one electrode disposed adjacent to each conducting solution introduction device.

28. The apparatus of claim 26, wherein said means for independently controlling said flow characteristics comprises a means for individually electrically turning on and off a respective spinneret.

29. The apparatus of claim 26, wherein said apparatus further comprises a pressure source for supplying conducting solution to said solution introduction device at a predetermined pressure.

30. The apparatus of claim 29, wherein said pressure source is adapted to control the supply rate of conductive fluid at a constant flow rate.

31. The apparatus of claim 29, wherein said pressure source is adapted to control the supply of conductive fluid at a constant pressure.

32. The apparatus of claim 26, wherein said apparatus comprises a pressure source for supplying different conducting solutions to at least two solution introduction devices.

33. A method of making a network of fibers wherein, said network comprises fibers comprising mesoporous precursor material, and further wherein, said fibers are produced by electrospinning.

34. The method of claim 33, wherein the mesoporous material comprises gels prepared with surfactants.

35. The method of claim 34, wherein said surfactants are selected from the group consisting of pluronic P-123, pluronic F-127, pluronic F-77, pluronic P-104, pluronic F-38, pluronic L-121, Vitamin E TPGS, Tergitols, Triton-X, polyethylene glycol, alkyl ammonium halides, alkyl amines and mixtures thereof.

36. The method of claim 33, wherein said mesoporous material is a metal oxide selected from the group consisting of silicon dioxide, aluminum oxide, titanium dioxide, niobium oxide, tungsten oxide, tantalum oxide, vanadium pentoxide, indium tin oxide, calcium aluminate and mixtures thereof.